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Reducing Fuel Subsidies and the Implication on Fiscal Balance and Poverty in Indonesia: A Simulation Analysis

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Abstract

An increase in world oil prices has forced the government of Indonesia to run a larger budget deficit to finance energy subsidies. Between 2000 and 2011, Indonesia burnt 61 per cent of oil and gas revenues to fuel and electricity subsidies. These subsidies worsen income distribution in Indonesia since almost 72 per cent of these subsidies are enjoyed by the 30 per cent of the richest income groups. Therefore, there are strong economic arguments to reallocate fuel subsidies to infrastructures, education and health sectors that can boast economic growth. Applying a CGE-Microsimulation, this study found that removing 25 per cent of fuel subsidies increases the incidence of poverty by 0.253 per cent. If this money were fully allocated to government spending, the poverty incidence would decrease by 0.270 per cent. Moreover, the 100 per cent removal of fuel subsidies and the reallocation of 50 per cent of them to government spending, transfers and other subsidies could decrease the incidence of poverty by 0.277 per cent. However, these reallocation policies might not be effective to compensate the adverse impacts of the 100 per cent removal of fuel subsidies if economic agents try to seek gain through mark-up pricing over the increase of production costs.

JEL Classifications: C68, I32, Q42, Q48

Keywords: fuel subsidies, fiscal balance, poverty, Indonesia, energy policy

1. Introduction

Indonesia has not been an oil-exporting country and has had decreasing oil production and increasing consumption since 2003. Its crude oil production decreases by roughly 4 per cent per year while fuel consumption increases by roughly 2 per cent per year. Indonesia is suffering fiscal pressures due to the decrease in oil revenue and rapid increase in fuel subsidies. This is because fuel prices in Indonesia are not determined by market mechanisms but administratively by the government. Oil revenues and fuel subsidies, therefore, always dominate the nation's economic policy agenda when the world oil prices sharply fluctuate.

The world oil prices were unpredictable during the last 10 years. Figure 1 shows the price was 29.52 USD/Barrel (Jan. 2001), 46.82 USD/Barrel (Jan. 2005), 133.93 USD/Barrel (Jun. 2008), 64.14 USD/Barrel (July 2009) and 108.58 USD/Barrel (Mar. 2011). In 2008, Agustina et al. (2008) confirmed that the Indonesian government was forced to spend around 27.93 per cent of its total budget on energy subsidies and 80 per cent of this was allocated for fuel subsidies. Son (2008) remarked that Indonesia spent 5 per cent of

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its gross domestic product (GDP) on energy subsidies. Other developing and emerging economies, where governments have significant influence over domestic prices, had increased fiscal costs, responding to the large increase in world fuel prices during 2003-2006. Baig et al. (2007) observed that, in 2005, fuel subsidies (as a percentage of GDP) cost around 5.8 per cent in Jordan, 9.2 per cent in Yemen, 13.9 per cent in Azerbaijan and 4.1 per cent in Egypt. This condition forced governments to pass the world fuel prices onto the domestic markets to reduce fiscal burdens.

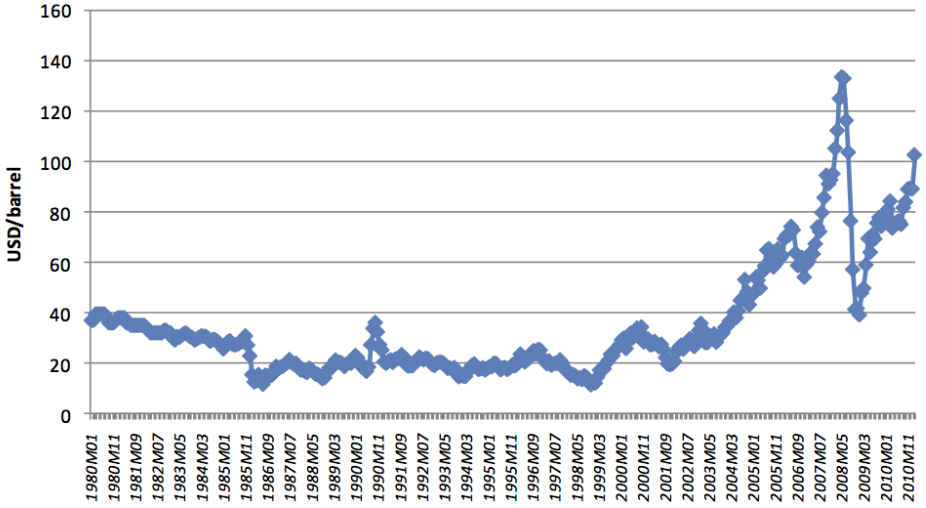
Massive fuel subsidies reduce fiscal space so governments have fewer sources to promote economic growth through investment in infrastructure or human capital. It would also worsen income distribution in Indonesia because most of the fuel subsidies are enjoyed by the non-poor groups, rather than by poor groups. Table 1 shows, in 2008, more than 41 per cent of gasoline subsidies benefitted the top richest income groups in Indonesia. The 30 per cent of the richest income groups enjoyed almost 72 per cent of gasoline subsidies. In the other hand, kerosene subsidies were distributed more equal to all households compared to gasoline subsidies. The 30 per cent of the lowest income groups consumed 16 per cent of kerosene subsidies and only 4 per cent of gasoline subsidies. Generally, the richest income group received fuel subsidies approximately IDR 111,533/month/capita while the lowest income group received fuel subsidies approximately IDR 10,787/month/capita. The richest income group enjoyed fuel subsidies more than 10 times larger than that of the lowest income group.

The Indonesian government will continually attempt to change the subsidy system from product subsidies, such as fuel and electricity, to direct subsidies, such as cash transfer and productive activities such as education, health, infrastructure and entrepreneurship. Moreover, starting from 2003, the Indonesian government deregulated fuel prices for industries, particularly for the mining, quarrying, cement and steel industries, in which the domestic price is delivered to the market following the world price. This policy was regulated with No.31K/20/MEM/2003 and 31/KMK.01/2003. These changes aim to reduce the budget deficit and improve the allocation of appropriate budgetary targets for the poor. Nevertheless, the Indonesian government still regulated the retail prices of fuels; it therefore has to spend a significant amount of money to subsidise the disparity between world and domestic prices when there is a big gap between the two. The government is forced to adjust domestic fuel prices following the fluctuation of world oil prices to reduce the fiscal deficit.

The drastic reduction of fuel subsidies in 2005 resulted in misery for the poor. In addition to increasing the cost of energy, it also indirectly increased non-fuel prices (e.g. increasing the cost of living, food, transportation, etc.). The Central Statistical Agency (henceforth BPS) showed the number of poor people increased by around 3.95 million people during 2005-2006. One reason for the massive increase in poverty was the massive reduction in fuel subsidies in 2005. On the other hand, in order to mitigate the negative impact of the removal of fuel subsidies, the government implemented the Program Kompensasi Pengurangan Subsidi-BBM (compensation programme for fuel subsidy reduction) in 2005 and 2008. This programme included cash transfer, health insurance, education subsidies and also rural infrastructures development.

Many studies have shown that cutting subsidies has adverse impacts on poverty and inequality. Ikhsan et al. (2005) found that decreasing the fuel subsidies in 2005, without compensation, increased the Indonesian poverty index from 16.3 per cent to 16.7 per cent. Yusuf and Resosudarmo (2008) stated that the price reform could have been progres-

Figure 1: The Monthly World Crude Oil Price (1980-2010)



Source: Plot based on the IMF Primary Commodity Statistics

sive in reducing inequality if it only increased vehicle fuel prices but that it actually tended to increase inequality, especially in urban areas where the price of kerosene also increased. A uniform cash transfer to poor households that disregards poor households' heterogeneity tends to over-compensate the rural poor but under-compensate the urban poor. Azis (2006) showed that the drastic and massive reduction in fuel subsidies in 2005 was not unnecessary, especially considering the adverse socio-economic, poverty and political repercussions of it. The reduction in fuel subsidies could have been substituted by reducing subsidies for the banking sector; providing that the saved money were spent on agricultural-related infrastructures, it could have produced a favourable outcome in terms of income distribution and poverty conditions without deteriorating macro-economic stability or injuring investors' confidence.

Removing fuel subsidies, of course, affects low income groups as it decreases their purchasing power. On the other hand, an increase in infrastructure spending can remove infrastructure bottlenecks and create job opportunities. In addition, an increase in both education and health spending can equip the poor to be more competitive and creative. Many studies, such as Jung and Thorbecke (2001), Fan et al. (2000), Davis et al. (2001) and Roberts (2003), have confirmed that spending on education, health and infrastructure effectively reduces poverty all over the world. Clements et al. (2006) found that the 2005 Indonesian reduction in fuel subsidies, in the short run, will increase price levels and reduce household consumption, particularly for the poor. However, in the long-term, given the contribution of subsidy reduction to fiscal sustainability (a precondition for durable economic growth and poverty reduction), the subsidy reduction will be beneficial to the poor.

Massive fuel subsidies reduce the fiscal spaces used to promote economic growth and create job opportunities; reducing fuel subsidies significantly increases the number of poor. Reallocating fuel subsidies into either infrastructure developments or human capital investments might increase poverty in the short run but might decrease poverty in the long run, due to improvements in infrastructures and in-

creases in human capital. There are, however, three main questions that must be asked in relation to this: firstly, what is the relationship between fuel subsidies and fiscal balance? Secondly, how large is the impact on poverty when removing fuel subsidies? Thirdly, how effective are reallocation policies in protecting low income groups from the adverse impacts of removing fuel subsidies? This article deals with these three issues and will provide an objective and comprehensive picture of fuel price policy in Indonesia, considering both fiscal and poverty issues. Unlike previous research, this study applies comprehensive methodologies in order to calculate the poverty impacts of removing subsidies and reallocation budget policies. The methodologies are a combination of a macro model (a computable general equilibrium (CGE)), a micro model (household data) and also the endogenous poverty line. Combining the macro and micro models will result in a robust outcome with regards to calculating the poverty impact of policy reforms.

In the following section, this article briefly reviews the current condition of the supply and demand of fuels in the domestic market, government fiscal balance and adjustment of fuel prices. Section 3 reviews the research methodology of a CGE micro-simulation analysis. Section 4 analyses the poverty impact of removing fuel subsidies and reallocating the saved money to protect the poor from the adverse impacts. Finally, the article will conclude with the key findings of the study and policy suggestions for possible reallocation policies to reduce adverse impacts.

2. Oil Production and Consumption, Fiscal Balance and Fuel Price Regimes

2.1. Oil Production and Fuel Consumption

Since 2003, Indonesia has become a net fuel and oil importer country, as production and refinery capacity have stagnated while consumption has grown rapidly. The ratio between crude oil production and fuel consumption has been continuously decreasing (it decreased from 127.7 per cent in 2000 to 69.58 per cent in 2009), mainly due to lack of investment in exploring new oilfields and declining production from maturing fields. In addition, an increase in the middle class population also put pressure on fuel demands. These figures imply that even if all the domestic crude oil were refined in Indonesia, it would not be enough to fulfil the domestic demand.

Figure 2 shows that Indonesia's crude oil production decreased from 1,272.5 thousand barrel per day (bpd) in 2000 to 826.1 thousand bpd in 2009, while fuel consumption grew rapidly from 996.4 thousand bpd in 2000 to 1,187.3 thousand bpd in 2009. The export trend of crude oil has continuously declined at almost 7 per cent per year, while the import trend of crude oil grew rapidly at 5.4 per cent per year during 2000-2009. The ratio between refinery capacity and total consumption substantially decreased from 106 per cent in 2000 to 89 per cent in 2009. Since 2002, domestic refineries have not been able to satisfy domestic fuel demands. Meanwhile, for technical reasons, some domestic refineries have not been able to process the domestic crude oil. Therefore, Indonesia has to import both petroleum products and crude oil products to fill the gap. On the other hand, proven oil reserves decreased from 5,123 million barrels in 2000 to 3,990 million barrels in 2009, mainly due to the level of exploitation without any significant investment into exploring new oilfields.

2.2. Fiscal Balance of Oil and Gas Products

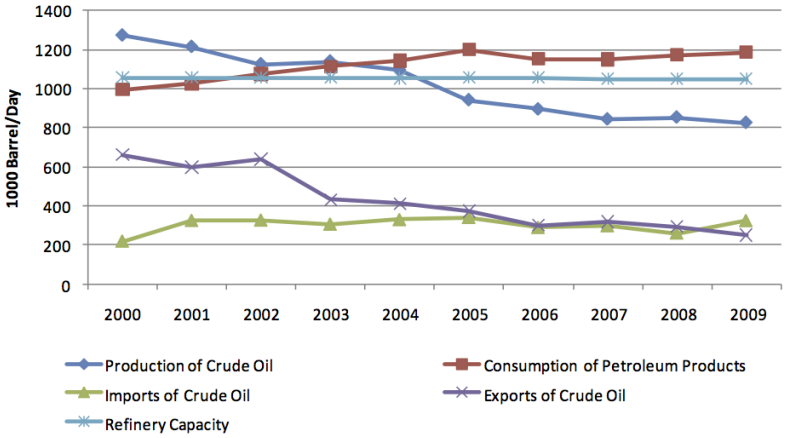
Oil and gas revenues contribute a significant share to Indonesia's central government budget. Table 2 shows the highest share was in 2000; in this year, almost 43 per cent of central government revenue came from oil and gas revenues. The contribution of oil and gas on budget has tended to decrease, mainly due to a shrink in lifting capacity and increases in other government revenues. Indonesia's bud-

Table 1: Share of Fuel Subsidies Received by Households in 2008

Deciles**	Share of Fuel Subsidies (%)			HH Expenditure*	Fuel Subsidy
	Kerosene	Gasoline	"Diesel Fuel"		Received by HH*
1	3.70	0.55	0.05	123,256	10,787
2	5.28	1.32	0.49	164,925	16,410
3	7.00	2.19	0.84	196,632	22,573
4	8.15	3.39	1.24	229,225	27,802
5	9.73	4.70	1.93	265,084	34,436
6	11.59	6.78	2.17	308,761	43,114
7	13.56	9.10	2.35	363,421	52,581
8	15.03	12.56	5.02	440,198	62,975
9	14.60	17.63	16.95	571,048	72,031
10	11.36	41.77	68.95	1,090,754	111,533

Source: Author's calculation based on SUSENAS 2008.
Note: *IDR /Month /Capita. **Household Group by Consumption. Fuel Subsidies received by households=(Market Fuel Prices-Subsidized Fuel Prices)*Quantity of Fuel Consumptions.

Figure 2: Oil and Petroleum Products in Indonesia, 2000-2009



Source: OPEC Annual Statistical Bulletin 2009 (OPEC, 2010).

get, therefore, is becoming less dependent on oil and gas revenues.

An increase in oil and gas prices increases not only oil revenues but also expenditures. This is because the Indonesian government has to share oil and gas revenues with sub-national governments through the oil-gas revenue sharing and general allocation fund (DAU), as a consequence of the "big bang" fiscal decentralisation in 2001. The government has to allocate a larger share of revenues to subsidise fuel and electricity as a result of administered retail energy prices. Historically, oil and gas revenues have exceeded fuel subsidy expenditures and sub-national government transfers, the exception being those years with large increases in world oil prices. Until 2004, oil and gas were black gold to Indonesia's central government budget balance. However, when the world oil price significantly increases, oil and gas would be a black hole to the government's budget balance. The government could still enjoy the net benefit of oil and gas revenues in the period of high price oil price between 2006 and 2009, mainly due to the effect of the adjustment of retail fuel prices in 2005 and 2008.

Table 2 shows the magnitude of oil and gas revenues and how these resources flow out of the Indonesian central government's budget: first, in the form of fuel and electricity subsidies; second, via sub-national government transfers as revenue sharing distributed to some producing regions; third, 26 per cent of the projected net oil and gas revenue budget is transferred to sub-national governments as part of a general allocation fund (DAU). The main black hole of oil and gas revenues is the fuel and electricity subsidies. During 2000-2011, Indonesia burnt and threw away an average of 61.2 per cent of oil and gas revenues a year on unproductive allocation. If the government had been able to cut fuel and electricity subsidies by 86 per cent, there would be no budget deficit in 2011.

The government of Indonesia subsidises the retail prices of various energy products, including gasoline, kerosene, diesel, Liquefied Petroleum Gas (LPG) and electricity. The share of subsidies to total expenditure has varied widely following movements in international oil prices, the exchange rate and adjustment to the subsidy regime (Table 3). They peaked in 2000, accounting for 22.6 per cent of total government expenditure. Fuel subsidies decreased sharply in 2002 following the adjustment of retail fuel prices in February 2000 and in June 2001. In early 2003, the Indonesian government tried to close the gap between domestic and world oil prices by deregulating fuel prices for industries; however, the retail fuel prices for households, small business and transportation remained regulated. Fuel subsidies then sharply increased in 2004 and 2005 following increases in world oil prices, but then decreased again in 2006 and 2007 after the government adjusted retail fuel prices in March and October 2005. However, responding to a high increase in world oil prices in 2008, the government was forced to allocate 15.1 per cent of its total spending to fuel subsidies; again, the government increased retail fuel prices in June 2008 to reduce fiscal pressure.

Table 3 shows that, during 2004-2011, Indonesia's share of development expenditures in relation to total spending is lower than that of the share of fuel and energy subsidies. Even during 2005-2010, the share of development expenditure was lower than 10 per cent. Low development expenditure might only be enough to replace existing capital, but not increase capital formation in the economy. The high share of fuel subsidies eliminates the opportunity of investing more in infrastructures, which is one of the necessary conditions to promote economic growth. Further, fuel subsidies consumed an average of 68.4 per cent of the total subsidies during 1995-2011 and peaked in 2000, accounting for 88.3 per cent of total subsidies. However, as mentioned before, most fuel subsidies are not enjoyed by low income groups. Transferring subsidies from middle income to poor households would improve income distribution and encourage more equal economic growth. In other words, continuing the current price system in which subsidies are enjoyed by the middle class is the same as creating structural poverty and crippling income distribution.

2.3. Adjustment of Retail Fuel Prices in Indonesia

Retail fuel prices have been irregularly adjusted in Indonesia following increases in world oil prices to reduce fiscal pressure. However, in contrast to the adjustment of industrial fuel prices, the government performs an ad-hoc adjustment of retail fuel prices. Figure 3 shows the domestic price trend of subsidised and unsubsidised fuel prices. The gasoline price was corrected by IDR 700/litre (1996), IDR 1,150/litre (Oct. 2000), IDR 1,450/litre (June 2001), IDR 1,810/litre (Mar. 2003), IDR 2,400/litre (Mar. 2005), IDR 4,500/litre (Oct. 2005), 6,000/litre (Jun. 2008), IDR 5,500/litre (1 Dec. 2008), IDR 5,000/litre (15 Dec. 2008) and IDR 4,500/litre (Jan. 2009). The highest adjustment price occurred in 2005, when

gasoline prices rose by 148 per cent from IDR 1,810/litre in January to IDR 4,500/litre in October.

During 2001-2009, the largest gap between the subsidised price and the market price of gasoline was observed in May 2008, reaching IDR 3,370/litre. This pushed the government to adjust domestic fuel prices, i.e. the price of gasoline rose from IDR 4,500/litre to IDR 6,000/litre. Under the administered price system, the government is always forced to make a price adjustment when the budget allocation for fuel subsidies does not sufficiently cover the price gap. The adjustment, however, always creates political and social instability because of rejections from politicians and societies.

Fuel subsidies in Indonesia tend to be highly regressive to the rich, a far from ideal social safety net and not environmentally friendly. This is due to reducing the fiscal space to invest in infrastructure or in humans capital; inefficiencies in targeting the poor; creating disincentives for households to consume fuels in an efficient way; undermining macro-economic stability (given the pro-cyclical trend of world oil prices); distorting price signals to industry and households; and creating opportunities for corruption and smuggling (Agustina et al., 2008). So, there are strong economic arguments to deregulate retail fuel prices or to remove fuel subsidies in Indonesia.

In the long-term, there are three main reasons for deregulating retailed fuel prices or removing fuel subsidies. Firstly, without the discovery of new oil reserves, Indonesian oil reserves would only last a further 15-20 years. Thus, the deregulation of retail fuel prices would prepare households for the condition when there is 100 per cent pass-through into the domestic market. Secondly, a fuel price adjustment or deregulation policy would give an incentive to use cheaper and more abundant domestic energy sources, such as coal and gas. Thirdly, on the environmental side, fossil fuels are a relatively "dirty" energy. Fuel price corrections would decrease fuel consumption and support the use of environmentally friendly energies, like natural gas or thermal energy.

Deregulation might not be easy to carry out due to strong objections, but the government should continuously attempt to allocate fuel subsidies in a more proper way. The key elements of a successful strategy to contain subsidies should comprise: making subsidies explicit; making pricing mechanisms more robust; combining reductions in subsidies with measures to protect the poorest; using the resulting savings well; and transparency and consultation (Baig et al., 2007).

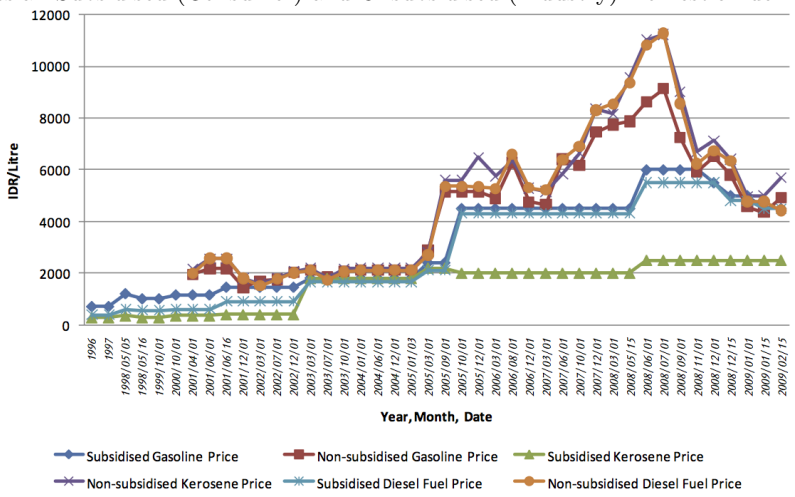
3. Research Methodology

3.1. CGE Micro-simulation

This research will use the CGE micro-simulation approach (CGE-MS) in order to calculate how reducing fuel subsidies and reallocating the money saved influences poverty in Indonesia. This approach is applied because it provides richness in household behaviour while remaining extremely flexible in terms of the specific behaviours that can be modelled. The general idea of the CGE-MS approach is that a CGE model feeds market and factor price changes into a micro-simulated household model. Chen and Ravallion (2004), Dartanto (2010), Dartanto and Usman (2011), Savard (2003, 2005) used this method and built micro-simulations based on economic assumptions that are consistent with the CGE model, notably that households take prices as given and that those prices clear all markets. They also did not attempt to assure full consistency between the micro-analysis and the CGE model's predictions.

There are five steps in calculating the poverty impact of reducing fuel subsidies and reallocation budget policies: firstly, the initial condition of poverty is calculated utilising the 2005 SUSENAS data (National Socio-Economic Survey) published by BPS, which covers 64,407 households. Secondly, using the CGE model,

Figure 3: Indonesian Subsidised (Consumer) and Unsubsidised (Industry) Domestic Fuel Prices 1996-2009



Source:Author's Compilation based on Data from Department of Energy and Mineral Resources, Republic of Indonesia.

the impact of reducing fuel subsidies and reallocation budget policies on domestic prices is simulated (including factor incomes). Thirdly, the price increases (including factor incomes) obtained from the CGE model are entered into the SUSENAS data set to calculate the impact of reducing fuel subsidies and reallocation budget policies on household welfare. This step is known as the microsimulation procedure. Fourthly, the poverty line is adjusted using price changes gained from the CGE model in which the poverty line becomes endogenous. Finally, the poverty incidence is recalculated using data from steps three and four and compared with the initial poverty incidence.

3.1.1. Indonesian Computable General Equilibrium

Computable General Equilibrium (CGE) models are a class of economic models that uses actual economic data to estimate how an economy might react to changes in policy, technology or other external factors. The static CGE model is built based on the extension of the 2005 Indonesian Social Accounting Matrix (SAM) and follows the algorithm of the International Food Policy Research Institute (IFPRI) standard CGE model developed by Lofgren, Harris and Robinson (2001). The data used for the extension of SAM refers to the 2005 Input-Output Table, the 2005 National Socio-Economic Survey, the labour force survey and other sources. The CGE model used in this research is based on the CGE model built by Dartanto (2010) and Dartanto and Usman (2011).

3.1.2. Microsimulation

Reducing fuel subsidies and reallocating the budget will influence household welfare through changes in the price of domestic commodities and in factor incomes. The microsimulation procedure basically translates how price changes (factor incomes) from the CGE can influence household welfare. This research modified Chen and Ravallion's work (2004) to calculate the monetary value of household welfare changes in response to changes in prices and factor incomes. Increasing prices would reduce a household's ability to afford an initial bundle of consumption, while increasing factor incomes would increase household incomes. An increase in income means an increase in a

household's ability to consume more. The formula for household welfare change is shown below.

$$\Delta W_i = -\sum_{j=1}^{m} p_j(q_{ij} - s_{ij})\frac{dp_j}{p_j} + \sum_{k=1}^{n}\left(w_k L_{ik}\frac{dw_k}{w_k}\right) + \sum_{l=1}^{l}\left(r_l K_{il}\frac{dr_l}{r_l}\right) \quad (1)$$

Where,
ΔW_i is the welfare change of the household-i, i: 1,2,3,...,64,407;
q_{ij} is the quantity of product-j consumed by the household-i, j=1,2,3,...,26; product-j refers to classification in the CGE model;
s_{ij} is the quantity of product-j provided/supplied by household-i;

$(q_{ij} - s_{ij})$ is the net consumption of product-j that must be bought by household-i. According to the SUSENAS dataset, the value of household consumption is always larger than or equal to the value of household production $(q_{ij} \geq s_{ij})$;

p_j is the price of product-j;
dp_j is the price change of product-j;
L_{ik} is the labour supply of household-i in sector-k; sector-k refers to a labour category in the CGE model;
w_k is the wage in sector-k;
dw_k is the wage change in sector-k;
K_{il} is the non-labour endowment of household-i;
r_l is the rate of return; and
dr_l is the change in the rate of return.

The change in household welfare is the sum of the change in household expenditure and household income. The negative sign in the first part of the formula indicates that increasing prices will increase household expenditure and, consequently, lower household welfare. Conversely, the positive signs of the last two parts of the formula indicate that increasing wages and the non-labour rate of return will increase household income, thus increasing household welfare. This study assumes that the consumption pattern of households does not change following price changes. This assumption might be unrealistic in the long-term. However, due to the lack of information about the elasticity of substitution of the model or how it could be simplified, we are forced to assume there would be "no change in consumption pattern" to calculate the household welfare change.

The model also assumes that the change of household welfare will directly influence household consumption (expenditure) and there is no saving activity, i.e. households are not allowed to save the net welfare. The new expenditure function is shown below.

$$E_i((p_{0j} + dp_j), (y_{0i} + \Delta W_i)) = E_{0i}(p_{0j,y_{0i}}) + \Delta W_i \quad (2)$$

Where,
$E_i((p_{0j} + dp_j), (y_{0i} + \Delta W_i))$is household-i's expenditure after simulations of world oil prices and fuel subsidies;
$E_{0i}(p_{0j,y_{0i}})$is initial household-i's expenditure;
p_{0j} is the initial vector price;
y_{0i} is the initial endowment/income of household-i; and
$E_i((p_{0j} + dp_j), (y_{0i} + \Delta W_i))$is used to calculate the new poverty incidence.

3.1.3. Endogenous poverty line and poverty calculation

Increasing commodity prices as a consequence of deregulation in fuel prices will also increase the money metric of obtaining 2,100 calories. Therefore, the poverty line will become endogenous following a variation in relative prices (Decaluwe, Savard and Thorbecke, 2005; Dartanto, 2010; Dartanto and Usman, 2011). Hence, the initial food poverty line should be adjusted with the price change of food products in proportion to the share of

those products in the poverty line; it should also be adjusted with the price change of non-food products. Therefore, the new poverty line that changes following a variation in prices (known as the endogenous poverty line) can be calculated as:

$$Z_{pr} = PL_{pr} = FPL_{0pr}\left(1 + \frac{\Delta FP_{pr}}{FP_{0pr}}\right) + NFPL_{0pr}\left(1 + \frac{\Delta NFP_{pr}}{NFP_{0pr}}\right) \quad (3)$$

Where,
$Z_{pr} = PL_{pr}$ is the poverty line in province-p, p=1,. . . ,30, at region-r, r = urban and rural;
$FPL_{0pr}$is the initial food poverty line in province-p at region-r;
ΔFP_{pr} is the change in composite food price in province-p at region-r;
$FP_{0pr}$is the initial composite food price in province-p at region-r;
$NFPL_{0pr}$ is the initial non-food poverty line in province-p at region-r;
ΔNFP_{pr} is the change in composite non-food price in province-p at region-r; and
$NFP_{0pr}$is the initial composite non-food price in province-p at region-r.

The Central Bureau of Statistics (BPS) only annually publishes the aggregate value of the food poverty line (PFL) and the non-food poverty line (NFPL) for each province at the rural and urban level.
In order to calculate poverty, this study applies the FGT (Foster, Greer and Thorbecke, 1984) formula. The modified formula is shown overleaf.

$$HC_{\alpha} = \frac{1}{n}\sum_{i=1}^{q}\left(\frac{PL_r - E_{ir}}{PL_r}\right)^{\alpha} \quad (4)$$

Where,
HC_{α} is the headcount index (poverty incidence);
n is the population number;
i is the individual-i;
PL_r is the poverty line in region-r;
E_{ir} is the expenditure of individual-i in region-r;
q is the number of individuals below or at the poverty line; and
α is the parameter for the FGT.

When α is zero, the poverty measurement is the headcount index, which represents the percentage of the population below the poverty line. The poverty-gap index, PG, which measures the depth of poverty, is calculated by setting α to 1. The squared poverty gap is obtained with α equal to 2.

3.2. Simulation Scenarios

The aim of simulations is to find out how much changes in poverty occur under various scenarios of government fuel subsidies and reallocation budget policies. The base data for the simulations, including subsidy, government consumption and transfer, is drawn from the 2005 Social Accounting Matrix. The simulations are performed under several scenarios, which are basically divided into four categories (Table 4): firstly, simulating a reduction in fuel subsidies of 25 per cent (SIM1), 50 per cent (SIM2), 75 per cent (SIM3) and 100 per cent (zero subsidies) (SIM4). The second set of scenarios simulates cuts of 25 per cent to fuel subsidies and the reallocation of all money to government consumption and government transfers to households (SIM 5 and SIM 6). Thirdly, government cuts of 50 per cent to fuel subsidies and the reallocation of 50 per cent of the money to government spending and government transfers to households is simulated (SIM 7 and SIM 8). The final set of scenarios simulates government cuts of 100 per cent to fuel subsidies and the reallocation of 50 per cent of the money to government spending, government transfers to households and government subsidies (SIM 9 and SIM 10).

This study also performs other simulations: SIM1a, SIM2a, SIM3a, SIM4a, SIM5a, SIM6a,

SIM7a, SIM8a, SIM9a and SIM10a. These simulations are basically the same as the simulations in Table 4 but the main difference is that the price changes derived from the CGE model as results of the removal of fuel subsidies are marked up by two times. These simulations are conducted to ascertain how large the poverty impact of the removal of fuel subsidies would be if price changes in the economy were larger than the price changes generated by the CGE model. This is because the CGE model does not calculate for increases in inflation caused by other factors, like the tendency of businesses to shift the burden of fuel price hikes to consumers by exorbitant increases in product prices.

Various simulations are conducted in order to ascertain the sensitivity of poverty in respect to changes in subsidies and reallocation policies. Furthermore, the simulations are conducted under the following conditions: flexible government saving and fixed direct tax rates, flexible exchange rates and fixed foreign saving, fixed capital formation, labour fully employed and mobile across activities, capital fully employed and activity-specific and fixed domestic producer price (price numeraire).

4. The Poverty Impact of Reducing Fuel Subsidies and Reallocation Policies

4.1. CGE Results of Macroeconomic Variables

Generally, a decrease in fuel subsidies will be followed by a decrease in macro-economic indicators, such as private consumption, imports and gross domestic product (GDP), while other indicators, net indirect tax and the consumer price index (CPI) will increase (see Appendix 1). The simulation results show that a 100 per cent decrease in fuel subsidies increases the CPI by 0.77 per cent. An increase in CPI depletes household welfare, which ultimately decreases household (private) consumption as well as GDP. Moreover, a 100 per cent decrease in fuel subsidies leads to a decline in the domestic supply of fuel and chemical products of 1.10 per cent. Theoretically, a decrease in fuel subsidies increases the price of fuels and other products that use fuels as production inputs, reducing the demand for those goods and signalling domestic producers to lower their production.

Turning to changes in consumer prices and factor incomes, the CGE simulation shows that a decrease in fuel subsidies of 100 per cent increases the domestic consumer price of fuel and chemical products by 5.80 per cent (see Appendix 2). An increase in the domestic consumer price of fuel and chemical products will directly increase the price of other products and services, such as transportation, electricity and industrial products, which utilise fuels as a production input. This figure seems very small compared to real price increases in the economy. There are two main reasons: firstly, fuel prices had already been adjusted two times by 148 per cent in 2005; secondly, this CGE model does not capture the mark-up pricing behaviour of economic agents. Ikhsan et al. (2005) found that, responding to the adjustment of fuel prices in Indonesia, economic agents usually adjusted the price more than necessary. One example of this was the demand from public transportation drivers and Organda (the Association of Public Ground Transportations) to increase fares by 30 per cent to respond to the 29 per cent increase in fuel prices in 2005. Transportation fares are made up not only of operational costs but also of large capital costs. Fuels accounted for an average of 13 per cent of land transportation costs in Indonesia at the end of 2001. After fuel price hikes in 2002, it was estimated that fuel expenditure did not exceed 20 per cent of total production costs. Thus, the proper fare increase should have only been 4.8 per cent.

Furthermore, a decrease in fuel subsidies is disadvantageous to all labour categories except agricultural labour (see Appendix 3). The wage rate of agricultural labour rises approximately 0.47 per cent when fuel subsidies are cut by 100 per cent but the wage rate of other labour cat-

egories declines by between 0.28 and 2.97 per cent. The reason is that an increase in fuel prices and other products reduces the demand for those products and gives price signal to domestic producers to decrease the production of goods and services, decreasing the demand for non-agricultural labour, lowering up the wage of non-agricultural labour.

4.2. Poverty Impacts of Reducing Fuel Subsidies

In the CGE-microsimulation analysis, the poverty impacts of reducing fuel subsidies and reallocating the budget to government spending, government transfers to households and other subsidies depend solely on how large the effects of these shocks are on changing price levels and factor incomes in the economy. The extent to which price and factor income changes can influence the incidence of poverty depends on consumption patterns and the income sources of the poor. It also depends on how sensitive the poverty line is to price changes.

Table 5 summarises the impact of various subsidy regimes on poverty in Indonesia. Reducing fuel subsidies theoretically intensifies poverty, since the purchasing power of the poor decreases due to increases in the price of fuel products and other products using fuels as production inputs. Decreases in fuel subsidies of 25 per cent, 50 per cent, 75 per cent and 100 per cent increase the poverty headcount index by 0.259 per cent, 0.392 per cent, 0.670 per cent and 1.057 per cent, respectively. However, economic agents usually mark-up product prices to shift the burden of fuel price hikes to consumers; they sometimes seek to gain by exorbitant increases in product prices. Doubling consumer prices generated from the CGE model largely increases the poverty incidence by 0.476 per cent, 0.723 per cent, 1.338 per cent and 2.341 per cent. These figures equal 997 thousand, 1,514 thousand, 2,800 thousand and 4,900 thousand people in terms of Indonesia's population.

At the disaggregate level, all household categories suffer from the removal of fuel subsidies to any degree. Households that are working in the electricity, water, gas and construction sectors suffer the most from the removal of fuel subsidies. If the subsidy decreases by 100 per cent, the poverty headcount index rises by 1.325 per cent. In the case of mark-up pricing, the poverty incidence of this category rises by 3.231 per cent. The second largest adverse impacts of removing subsidies are observed in households working in the industrial sectors. If the subsidy decreases by 100 per cent, the poverty headcount index rises by 1.255 per cent (3.098 per cent in the case of mark-up pricing). Most households in both groups, particularly sub-groups working in construction and industry, are basically low income groups characterised as living in urban areas, unskilled and semi-skilled labour. Hence, an adjustment in fuel prices adversely affects these groups in terms of both expenditure and income. This is due to a sudden increase in the domestic price of fuel prices and related products to an unaffordable level and also to a decline in the wages of non-agricultural labour categories.

In terms of absolute numbers, poverty increases are more frequently observed in households working in the agricultural sectors. In Indonesia, the 100 per cent removal of fuel subsidies increases the number of poor in the agricultural household category (with and without land holdings) by 833,127 people (1,802,085 people in the case of mark-up pricing). Moreover, even though agricultural households benefit through a gradual increase in labour wages, this can only partially compensate for the household's increase in expenditure as a result of price increases. Therefore, decreases in fuel subsidies hurt agricultural households rather than benefit them.

Table 6 shows the poverty index that represents the gap between poor people's standard of living and the poverty line, showing the shortfall in the poor's expenditure from the poverty

line expressed as an average of the population of Indonesia. It can be interpreted as how far the poor are below the poverty line. The pattern of change in the poverty gap index in responding to decreases in fuel subsidies is no different from the changes in the headcount index. The lower the fuel subsidies, the wider the poverty gap index. An increase in the world fuel price of 25 per cent, 50 per cent, 75 per cent and 100 per cent increases the poverty gap index by 0.053 per cent, 0.086 per cent, 0.157 per cent and 0.255 per cent, respectively. This is because the negative impact of domestic price decreases the expenditure (welfare) of low income households that were previously above the poverty line so they drop below the poverty line; the expenditure of the poor that were already below the line falls further away from the poverty line. The poverty gap index worsens when the economic agents increase prices disproportionately.

Tables 7 and 8 show changes to the Headcount Index and the Poverty Gap Index under various budget reallocation schemes. Simulation 5 (SIM5), cutting 25 per cent of fuel subsidies and reallocating it to government spending (60 per cent) and government transfers to households (40 per cent), can perfectly absorb the adverse effects of reducing fuel subsidies and the number of poor decreases by 565,770 people (0.270 per cent). Increases in government spending on health, education, infrastructures and machinery/metal products generate job opportunities and gradually increase the factor incomes of unskilled, semi-skilled and skilled non-agricultural labours. A gradual increase in wage rates over-compensates the increase in expenditure as a result of price increases. Thus, the 100 per cent reallocation of the cut 25 per cent fuel subsidies benefits the poor.

Moreover, if the budget reallocation composition is changed to 80 per cent for government expenditures and 20 per cent for government transfers, the poverty incidence largely decreases by 1,118,120 people (0.534 per cent) (SIM6). This is because a larger government transfer to households, particularly to low income groups, increases the demand for food and processed food commodities and increases the prices of these products. This price increase reduces the welfare of households, particularly those of low income groups that spend a large proportion of their budget on food. However, the impact of reallocating fuel subsidies on reducing poverty will become smaller if economic agents extensively mark-up price products over the increased production costs in response to a reduction in fuel subsidies. SIM5a and SIM6a show that, even though in the mark-up condition a full reallocation of the 25 per cent cut in fuel subsidies still reduces poverty, the number of poor decreases only by 114,901 (SIM5a) and 614,962 (SIM6a).

SIM7 shows that if the government cuts 50 per cent of fuel subsidies (USD 5.03 billion) and reallocates 50 per cent of the money (USD 2.52 billion) to government expenditures (60 per cent) and government transfers to households (40 per cent), the number of poor still decreases by 290,281. In addition, shifting government transfers to government expenditures improves the effectiveness of budget reallocation in terms of reducing poverty, as shown by SIM8: the poverty incidence decreases by 857,412. As shown in the results of SIM5a and SIM6a, the mark-up in prices performed by economic agents in order to seek gains reduces the effectiveness of budget reallocation policies in reducing poverty in Indonesia. Under the mark-up condition, SIM7a and SIM8a are only able to reduce the number of poor by 101,511 and 164,797, respectively.

The 100 per cent removal of fuel subsidies and reallocating 50 per cent of the money saved to government expenditures, transfers and other subsidies does not have adverse impacts on household welfare. The poverty incidence even slightly decreases by 0.071 per cent (SIM9) and 0.277 per cent (SIM10). However,

policy makers should carefully interpret these results since it is assumed that all economic agents are well-behaved and do not increase the price of products larger than the increases in production costs. This is necessary to carry out credible price surveillances when the government implements policies that influence general price levels. With price surveillance, the government can control the price to avoid unnecessary inflation and the public can be protected from undue margins.

On the other hand, as is the case in most developing countries, it is difficult to guarantee that the government has a credible price surveillance system that can be used to determine how much prices should be increased in response to removing fuel subsidies. It is also necessary to have a strong institution to control and supervise the behaviour of economic agents that, by their nature, always try to seek benefits. If economic agents mark-up the price, a 100 per cent of removing fuel subsidies and 50 per cent reallocating of them to government expenditures, transfers and other subsidies, the number of poor will increase by 2,222,013 (SIM9a) and 1,640,115 (SIM10a). Thus, controlling inflation should be a top national concern. Easterly and Fischer (2001), observing many countries' experiences, found that the poor suffer more from inflation than the rich since high inflation tends to lower the income share and the real minimum wage of the bottom quintile that both of them tend to increase poverty.

At the disaggregate level, all household categories benefit from the reallocation of fuel subsidies into government expenditures and transfers, as shown by SIM5, SIM6 and SIM8. Landless agricultural households benefit the most from the removal of 25 per cent of fuel subsidies and full reallocation. The headcount index of this group decreases by 0.349 per cent (SIM5) and 0.751 (SIM6). Government spending, particularly on infrastructures, increases the demand for unskilled labour, while government transfers to low income groups increases the demand for agricultural products, pushing up the wage rate for agricultural labour. Both increases raise the incomes of landless agricultural households. However, agricultural households with land will benefit most under SIM8, while households working in the banking/financial sector and in government services will benefit most under SIM7. However, households working in the industrial and utility sectors are worst off under SIM7 and SIM9.

Households working in the utility and construction sector and the industrial sector suffer most under the mark-up pricing condition (SIM9a). The poverty incidence of these groups rises by 1.76 per cent and 1.48 per cent, respectively. Compensation policies on government transfers and government spending do not sufficiently cancel out the adverse impacts of reducing fuel subsidies. Most households in both groups, particularly sub-groups working in construction and industry, are basically low income groups characterised as living in urban areas performing unskilled and semi-skilled labour. Most of them, particularly those working in the construction sector, are cyclical migrant workers from rural area and they are not registered as urban residents. Thus, they are excluded from cash transfers from government assistance due to being an unregistered resident.

5. Sensitivity Analysis

CGE estimation results are known to be sensitive to the values of Armington elasticities. However, there have been few empirical studies on estimating these elasticities. Many studies show that the resulting estimates of these elasticities vary widely. McDaniel and Balistreri (2003) confirmed that the wide-ranging estimates of Armington elasticities depends on the data used, the disaggregating sector and the methodology applied. Table 9 shows that the impact of a 50 per cent decrease in fuel subsidies is slightly sensitive to the variation of Armington elasticity. An increase (or decrease) in

the Armington elasticity will be followed by an increase (or decrease) in the poverty incidence. At the national level, when fuel subsidies are reduced by 50 per cent, changing the elasticity from 1.5 to 2.5 will increase the headcount index from 0.392 per cent to 0.511 per cent, which is equivalent to an increase from 820,638 poor people to 1,069,123. Conversely, changing the elasticity from 1.5 to 0.75 will decrease the number of people in poverty from 820,638 to 795,270. The crucial question is: what is the appropriate Armington elasticity for the substitution of fuel and chemical products? In order to precisely estimate the poverty impact of removing fuel subsidies, the elasticities used in the CGE model should also be precisely estimated.

6. Concluding Remarks

An increase in world oil prices forced the Indonesian government to run a larger budget deficit to finance fuel subsidies, since Indonesia is a net oil importing country and retail fuel prices are still administered. During 2000-2011, Indonesia burnt and threw away an average of 61.2 per cent of its oil and gas revenues each year on fuel and electricity subsidies. Moreover, massive fuel subsidies reduce the fiscal space to promote economic growth as a prerequisite of poverty reduction. Since 2004, the share of development expenditures to total spending in Indonesia has been lower than the share of fuel and energy subsidies. Fuel subsidies, mostly enjoyed by middle and upper class, consumed an average of 68.4 per cent of the total subsidies during 1995-2011. Transferring subsidies from middle income to poor households would improve income distribution and accelerate more equal economic growth. Since Indonesian oil reserves would only last a further 15-20 years, a reduction in fuel subsidies is needed to prepare households for the condition when international fuel prices have 100 per cent pass-through into the domestic market.

The CGE micro-simulation results show that reducing fuel subsidies by 25 per cent increases poverty incidence by 0.253 per cent. However, if the saved money is fully allocated to government spending and transfers, the adverse impact can be cancelled out; even the poverty incidence will be reduced by 0.270. In addition, 100 removing per cent of fuel subsidies and then reallocating 50 per cent to government expenditures, government transfers and other subsidies does not have adverse impacts on household welfare; the poverty incidence even slightly decreases by 0.071 per cent (SIM9) and 0.277 per cent (SIM10). However, this reallocation budget might not effectively compensate the adverse impacts of the 100 per cent removal of fuel subsidies if the economic agents try to seek gains through mark-up pricing surpassing the increase in production costs. Hence, the government should perform price surveillance that can be used to determine how much prices should be increased to respond to removing fuel subsidies. Moreover, the budget reallocation should focus on government spending rather than on government transfers due to its effectiveness in reducing poverty.

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Table 2: Indonesian Central Government Oil and Gas Revenue and Expenditure Cash Flow 2000-2011 (Billion USD)

Revenue and Expenditure	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010*	2011**
Oil and Gas Revenue	10.3	10.2	8.6	9.4	12.2	14.3	22	18.5	26	16.91	22.8	22.72
less:												
Fuel Subsidies	6.5	6.7	3.5	3.5	7.8	9.9	7	9.2	13.9	0	0	0
Electricity Subsidies					0.3	0.4	3.3	3.6	6.6	0	0	0
National Budget Balance	3.8	3.5	5.1	5.9	4.1	4	11.7	5.7	5.5	16.91	22.8	22.72
less:												
"DAU (26% of APBN Projected Net Oil & Gas Revenue)"	0.6	0.9	2	1.9	1.9	1.3	1.5	4.4	4.4	4.3966	5.928	5.9072
Oil & Gas Revenue Sharing	1.5	1.5	1.2	1.5	1.7	2.8	3.1	2.6	3.6	2.38431	3.2148	3.20352
"Central Government Budget Balance"	1.7	1.1	1.9	2.5	0.5	-0.1	7.1	-1.3	-2.5	10.12909	13.6572	13.60928
"Fuel and Eletricity Subsidies as % of Total Oil and Gas Revenue"	0.63	0.66	0.41	0.37	0.66	0.72	0.47	0.69	0.79	0	0	0
"Oil and Gas Revenue as % of Total Government Revenue"	0	0	0	0	0	0	0	0	0	0	0	0
Budget Deficit	0	0	0	0	0	0	0	0	0	0	0	0
Note:												
Crude Oil Price (USD/barrel)	29	25	22	29	34	53	64	70	95	61.6	80	80
Oil Lifting (thousand bpd)	1405	1273	1320	1092	1072	999	1000	899	927	944	965	970

Source: Author's calculation based on data from Agustina et al. (2008) and the Ministry of Finance publications.
Note:* is based on the 2010 Revised Budget; **is based on the 2011 proposed budget

Table 3: Indonesian Central Government Expenditure and Subsidy Trend 1995-2011 (Billion USD)

Expenditure	1995	1996	1997	1998	1999	2000	2001	2002	2003
Total Subsidies	0.1	1	7.2	3.6	8.4	7.4	7.5	4.7	5.1
Fuel Energy Subsidies	-	0.6	3.3	2.9	5.2	6.3	6.7	3.4	3.5
Non-Fuel Subsidies	0.1	0.4	3.8	0.7	3.2	1.1	0.9	1.3	1.6
Development Expenditure	9.5	11.5	9.4	4.2	5.8	5	4.1	4	8.1
Total Expenditure	29	34.5	37	17.5	29.7	28	33.3	34.8	43.9
"Fuel Energy Subsidies as % of Total Subsidies"	-	60.00%	46.50%	79.90%	62.10%	85.60%	88.30%	71.40%	68.50%
"Fuel Energy Subsidies as % of Total Expenditure"	-	1.80%	9.00%	16.60%	17.60%	22.60%	20.00%	9.70%	8.00%
"Development Expenditure as % of Total Expenditure"	32.80%	33.20%	25.40%	24.10%	19.50%	17.90%	12.20%	11.60%	18.40%
Continued									
Expenditure	2004	2005	2006	2007	2008	2009	2010*	2011**	
Total Subsidies	10.2	12.4	11.8	16.4	28.2	15.4	22.2	21	
Fuel Energy Subsidies	7.7	9.8	7	9.1	15.3	9.9	15.9	15.2	
Non-Fuel Subsidies	2.5	2.6	4.7	7.2	12.9	5.6	6.3	5.8	
Development Expenditure	6.8	3.4	6.5	7	7.5	7.2	10.5	13.9	
Total Expenditure	47.5	52.5	73.3	82.7	101	97.1	124	136.9	
"Fuel Energy Subsidies as % of Total Subsidies"	75.30%	79.20%	59.80%	55.80%	54.10%	64.10%	71.50%	72.40%	
"Fuel Energy Subsidies as % of Total Expenditure"	16.10%	18.70%	9.60%	11.10%	15.10%	10.20%	12.80%	11.10%	
"Development Expenditure as % of Total Expenditure"	14.40%	6.40%	8.90%	8.50%	7.40%	7.40%	8.40%	10.10%	

Source:Author's calculation based on the Ministry of Finance publications.
Note:* is based on the 2010 Revised Budget; **is based on the 2011 proposed budget

Table 4: Simulation Scenarios (Billion USD)

Description	SIM1	SIM2	SIM3	SIM4	SIM5	SIM6	SIM7	SIM8	SIM9	SIM10
a. Cutting Fuel Subsidies	0.25	0.5	0.75	1	0.25	0.25	0.5	0.5	1	1
b. Value of Fuel Subsidies	2.52	5.03	7.55	10.07	2.52	2.52	5.03	5.03	10.07	10.07
c. Reallocation of Fuel Subsidies	-	-	-	-	2.52	2.52	2.52	2.52	5.03	5.03
1. Government Consumption (% of c)	-	-	-	-	60%	80%	60%	80%	60%	70%
"Education, Health and Government Services"	-	-	-	-	0.75	1.01	0.75	1.01	1.51	1.76
Machinery and Metal Products	-	-	-	-	0.23	0.3	0.23	0.3	0.45	0.53
Constructions and Infrastructures	-	-	-	-	0.53	0.7	0.53	0.7	1.06	1.23
Subtotal	-	-	-	-	1.51	2.01	1.51	2.01	3.02	3.52
"2. Government Transfers to Households (HH) (% of c)"	-	-	-	-	40%	20%	40%	20%	37%	28%
Agricultural Labor HH	-	-	-	-	0.28	0.14	0.28	0.14	0.52	0.39
Agricultural HH with Land <0.5 ha	-	-	-	-	0.23	0.11	0.23	0.11	0.42	0.32
Agricultural HH with 0.5 < land <1 ha	-	-	-	-	0.05	0.03	0.05	0.03	0.09	0.07
Rural Non-Agr. Low Income HH	-	-	-	-	0.3	0.2	0.3	0.2	0.37	0.28
Rural Non-Labour force HH	-	-	-	-	0.1	0.07	0.1	0.07	0.12	0.09
Urban Non-Agr. Low Income HH	-	-	-	-	0.21	0.14	0.21	0.14	0.26	0.2
Urban Non-Labour force HH	-	-	-	-	0.07	0.04	0.07	0.04	0.08	0.06
Subtotal	-	-	-	-	1.23	0.73	1.23	0.73	1.86	1.41
3. Subsidies (% of c)	-	-	-	-	-	-	-	-	3%	2%
Agricultural Subsidies on Food Productions	-	-	-	-	-	-	-	-	0.05	0.03
Land Transportation	-	-	-	-	-	-	-	-	0.04	0.03
Water and Air Transportation	-	-	-	-	-	-	-	-	0.03	0.02
"Government Services: Education and Health"	-	-	-	-	-	-	-	-	0.04	0.03
Subtotal	-	-	-	-	-	-	-	-	0.15	0.1
"d. Government Saving to Finance Deficit"	2.52	5.03	7.55	10.07	0	0	2.52	2.52	5.03	5.03

Source:Author

Table 5: Simulated Changes in the Headcount Index (%) of Indonesia under Various Fuel Subsidy Systems

Sector	Population.	Initial Poverty 2005	SIM1	SIM2	SIM3	SIM4	SIM1a	SIM2a	SIM3a	SIM4a
Agriculture (with Land)	57332312	23.81	0.201	0.291	0.617	1.046	0.423	0.567	1.193	2.331
Agriculture (without Land)	20448294	25.73	0.241	0.346	0.693	1.143	0.549	0.731	1.262	2.276
Industry	19916155	11.25	0.293	0.578	0.87	1.255	0.621	1.048	1.776	3.098
"Electricity, Water, Gas and Constructions"	14312875	17.66	0.49	0.808	1.053	1.325	0.808	1.237	2.196	3.231
"Trade, Hotel, Restaurant, Transportation and Telecommunication"	47234503	10.81	0.214	0.317	0.504	0.923	0.358	0.55	1.11	2.042
"Banking, Financial Int., Government and Private Services"	26863587	6.94	0.294	0.408	0.657	0.91	0.437	0.745	1.225	1.816
Others	23201581	15.81	0.296	0.4	0.723	1.118	0.501	0.834	1.45	2.441
Total	209309307	16.4	0.259	0.392	0.67	1.057	0.476	0.723	1.338	2.341
Number of Poor		34320060	541379	820638	1401467	2212590	996852	1513984	2799658	4900292

Note: SIM1-SIM4 are Cutting Fuel Subsidies. SIM1a-SIM4a are "Cutting Fuel Subsidies (Mark-up Pricing (Doubles than the CGE's Result))"
Source:Author's calculation.

Table 6: Simulated Changes in the Poverty Gap Index (%) of Indonesia under Various Fuel Subsidy Systems

Sector	Population	Initial Poverty 2005	SIM1	SIM2	SIM3	SIM4	SIM1a	SIM2a	SIM3a	SIM4a
Agriculture (with Land)	57,332,312	4.71	0.048	0.068	0.14	0.252	0.1	0.139	0.286	0.52
Agriculture (without Land)	20,448,294	5.52	0.06	0.09	0.17	0.3	0.12	0.18	0.35	0.61
Industry	19,916,155	2.1	0.07	0.12	0.2	0.3	0.13	0.25	0.42	0.66
"Electricity, Water, Gas and Constructions"	14,312,875	3.01	0.108	0.207	0.335	0.501	0.216	0.423	0.698	1.071
"Trade, Hotel, Restaurant, Transportation and Telecommunication"	47,234,503	2.01	0.039	0.066	0.122	0.194	0.086	0.141	0.25	0.415
"Banking, Financial Int., Government and Private Services"	26,863,587	1.36	0.03	0.06	0.109	0.158	0.07	0.129	0.227	0.352
Others	23,201,581	3.4	0.062	0.096	0.169	0.271	0.116	0.192	0.349	0.585
Total	209,309,307	3.24	0.053	0.086	0.157	0.255	0.107	0.178	0.325	0.542

Note: SIM1-SIM4 are Cutting Fuel Subsidies. SIM1a-SIM4a are "Cutting Fuel Subsidies (Mark-up Pricing (Doubles than the CGE's Result))"
Source:Author's calculation.

Table 7: Simulated Changes in the Headcount Index (%) under Various Budget Reallocations

Sector	Population	"Initial Pov. 2006"	SIM5	SIM6	SIM7	SIM8	SIM9	SIM10	SIM5a	SIM6a	SIM7a	SIM8a	SIM9a	SIM10a
Agriculture (with Land)	57,332,312	23.81	-0.266	-0.613	-0.214	-0.542	-0.214	-0.469	-0.102	-0.386	-0.274	-0.115	0.94	0.587
Agriculture (without Land)	20,448,294	25.73	-0.349	-0.751	-0.165	-0.636	-0.02	-0.225	0.033	-0.339	-0.125	-0.148	1.127	0.993
Industry	19,916,155	11.25	-0.319	-0.496	0.015	-0.235	0.186	0.041	0.108	-0.12	0.291	0	1.481	1.302
"Electricity, Water, Gas and Constructions"	14,312,875	17.66	-0.339	-0.772	0.011	-0.36	0.305	-0.007	0.091	-0.273	0.434	-0.105	1.764	1.365
"Trade, Hotel, Restaurant, Transportation and Telecommunication"	47,234,503	10.81	-0.191	-0.397	-0.096	-0.314	-0.031	-0.274	-0.014	-0.219	-0.022	-0.007	1.028	0.719
"Banking, Financial Int., Government and Private Services"	26,863,587	6.94	-0.312	-0.479	-0.263	-0.377	-0.286	-0.395	-0.263	-0.369	-0.105	-0.132	0.536	0.385
Others	23,201,581	15.81	-0.239	-0.378	-0.098	-0.295	-0.051	-0.163	-0.089	-0.255	-0.003	-0.062	1.188	0.874
Total	209,309,307	16.4	-0.27	-0.534	-0.139	-0.41	-0.071	-0.277	-0.055	-0.294	-0.048	-0.079	1.062	0.784
Number of Poor		34,320,060	-565,770	-1,118,120	-290,281	-857,412	-149,381	-580,657	-114,901	-614,962	-101,511	-164,797	2,222,013	1,640,115

Note: SIM5,SIM5a SIM6 and SIM6a: 25% Cut Subsidies and Reallocated 100%. SIM7, SIM7a, SIM8 and SIM8a: 50% Cut Subsidies and Reallocated 50%. SIM9, SIM9a, SIM10 and SIM10a:100% Cut Subsidies and Reallocated 50%.
Source:Author's calculation.

Table 8: Simulated Changes in the Poverty Gap Index (%) under Various Budget Reallocations

Sector	Pop.	"Initial Pov. 2006"	SIM5	SIM6	SIM7	SIM8	SIM9	SIM10	SIM5a	SIM6a	SIM7a	SIM8a	SIM9a	SIM10a
Agriculture (with Land)	57,332,312	4.71	-0.072	-0.149	-0.053	-0.132	-0.043	-0.107	-0.025	-0.083	-0.065	-0.028	0.221	0.139
Agriculture (without Land)	20,448,294	5.52	-0.07	-0.15	-0.04	-0.12	-0.02	-0.08	-0.01	-0.07	-0.03	-0.04	0.3	0.22
Industry	19,916,155	2.1	-0.04	-0.1	0.01	-0.05	0.04	0	0.02	-0.03	0.07	0.01	0.36	0.29
"Electricity, Water, Gas and Constructions"	14,312,875	3.01	-0.069	-0.157	0.02	-0.069	0.079	0.01	0.039	-0.04	0.137	0.021	0.609	0.52
"Trade, Hotel, Restaurant, Transportation and Telecommunication"	47,234,503	2.01	-0.033	-0.079	-0.007	-0.053	0.016	-0.02	0.003	-0.03	0.013	0	0.214	0.168
"Banking, Financial Int., Government and Private Services"	26,863,587	1.36	-0.072	-0.111	-0.052	-0.09	-0.068	-0.106	-0.042	-0.081	-0.039	-0.042	0.09	0.043
Others	23,201,581	3.4	-0.051	-0.112	-0.018	-0.08	0.003	-0.047	0.001	-0.05	0.007	-0.01	0.286	0.216
Total	209,309,307	3.24	-0.058	-0.12	-0.026	-0.09	-0.009	-0.06	-0.008	-0.058	-0.006	-0.016	0.257	0.19

Note: SIM5 and SIM6: 25% Cut Subsidies and Reallocated 100%. SIM7 and SIM8: 50% Cut Subsidies and Reallocated 50%. SIM9 and SIM10:100% Cut Subsidies and Reallocated 50%. SIMa5 and SIM6a: 25% Cut Subsidies and Reallocated 100%. SIM7a and SIM8a: 50% Cut Subsidies and Reallocated 50%. SIM9a and SIM10a:100% Cut Subsidies and Reallocated 50%.
Source:Author's calculation.
Source:Author's calculation.

Table 9: Headcount Index under Varying Armington Elasticities of Substitution in Fuel and Chemical Products

Sector	Population	"Initial Poverty 2005"	Armington Elasticity		
			0.75	1.5	2.5
Agriculture (with Land)	57,332,312	23.81	0.272	0.291	0.501
Agriculture (without Land)	20,448,294	25.73	0.338	0.346	0.579
Industry	19,916,155	11.25	0.578	0.578	0.638
"Electricity, Water, Gas and Constructions"	14,312,875	17.66	0.808	0.808	0.853
"Trade, Hotel, Restaurant, Transportation and Telecommunication"	47,234,503	10.81	0.29	0.317	0.362
"Banking, Financial Int., Government and Private Services"	26,863,587	6.94	0.408	0.408	0.446
Others	23,201,581	15.81	0.4	0.4	0.534
Total	209,309,307	16.4	0.38	0.392	0.511
Number of Poor		34,320,060	795,270	820,638	1,069,123

Source:Author's calculation.

Appendix 1. Simulated Macroeconomic Indicator and Domestic Production Changes (%) under Various Simulations of Fuel Subsidy Systems and Reallocation Policies

Description	Initial Value	SIM1	SIM2	SIM3	SIM4	SIM1a	SIM2a	SIM3a	SIM4a	SIM5	SIM6	SIM7	SIM8	SIM9	SIM10	SIM5a	SIM6a	SIM7a	SIM8a	SIM9a	SIM10a
Selected Macroeconomic Indicators (Real Value)																					
Private Consumption	23,848.9	-0.02	-0.04	-0.06	-0.09	-0.04	-0.08	-0.13	-0.18	-0.60	-0.79	-0.62	-0.82	-1.26	-1.46	-0.64	-0.83	-0.70	-0.90	-1.45	-1.64
Exports	10,011.0	-0.04	-0.08	-0.12	-0.17	-0.08	-0.16	-0.25	-0.35	-0.14	-0.18	-0.18	-0.22	-0.40	-0.43	-0.22	-0.26	-0.34	-0.38	-0.74	-0.78
Imports	-9,191.8	-0.04	-0.09	-0.14	-0.19	-0.08	-0.17	-0.27	-0.38	-0.16	-0.20	-0.20	-0.24	-0.43	-0.47	-0.24	-0.28	-0.38	-0.42	-0.81	-0.85
Net Income Tax	780.8	0.30	0.62	0.95	1.30	0.61	1.24	1.91	2.61	0.16	0.06	0.48	0.38	1.00	0.90	0.77	0.67	1.73	1.63	3.60	3.50
Gross Domestic Product	31,502.8	-0.02	-0.05	-0.07	-0.10	-0.04	-0.09	-0.14	-0.20	-0.03	-0.03	-0.05	-0.05	-0.12	-0.13	-0.07	-0.07	-0.14	-0.15	-0.32	-0.33
Consumer Price Index (CPI)	120.0	0.16	0.24	0.46	0.77	0.33	0.48	0.92	1.54	0.18	0.13	0.12	0.08	0.54	0.46	0.22	0.17	0.37	0.32	1.31	1.23
Selected Domestic Output Growth																					
Food Croops	2,231.6	0.01	0.02	0.03	0.04	0.02	0.03	0.05	0.07	0.01	0.01	0.02	0.01	0.06	0.05	0.03	0.02	0.05	0.05	0.13	0.12
Livestock	768.5	0.02	0.04	0.05	0.07	0.04	0.07	0.11	0.15	-0.11	-0.15	-0.10	-0.13	-0.19	-0.29	-0.08	-0.12	-0.02	-0.06	-0.04	-0.14
Forestry	270.9	0.02	0.04	0.06	0.08	0.04	0.08	0.12	0.16	0.18	0.27	0.20	0.29	0.39	0.48	0.22	0.30	0.28	0.36	0.55	0.64
Fishery	748.9	0.01	0.02	0.03	0.04	0.02	0.04	0.07	0.09	-0.08	-0.11	-0.07	-0.10	-0.16	-0.18	-0.06	-0.09	-0.03	-0.06	-0.07	-0.10
Oil and Metal Mining	1,497.3	-0.11	-0.22	-0.42	-0.53	-0.22	-0.43	-0.85	-1.06	-0.19	-0.22	-0.30	-0.33	-0.70	-0.71	-0.41	-0.43	-0.73	-0.76	-1.77	-1.77
Other Mining and Quarrying	363.7	-0.02	-0.04	-0.07	-0.09	-0.04	-0.08	-0.13	-0.18	0.54	0.73	0.52	0.71	1.03	1.22	0.51	0.69	0.44	0.63	0.85	1.03
Rice	1,330.6	0.01	0.03	0.04	0.06	0.03	0.06	0.09	0.12	-0.05	-0.08	-0.03	-0.06	-0.07	-0.10	-0.02	-0.05	0.02	0.00	0.05	0.02
Food and Beverage Industry	3,493.4	0.04	0.08	0.12	0.17	0.08	0.16	0.25	0.33	-0.15	-0.17	-0.11	-0.13	-0.23	-0.34	-0.07	-0.09	0.06	0.04	0.10	-0.01
Textile-clothes-leather Industry	1,424.9	0.02	0.04	0.06	0.08	0.04	0.08	0.12	0.15	-0.20	-0.32	-0.18	-0.30	-0.49	-0.50	-0.16	-0.28	-0.10	-0.22	-0.34	-0.35
Wood Processing Industry	415.4	0.04	0.07	0.11	0.15	0.07	0.15	0.22	0.29	0.05	0.12	0.09	0.16	0.12	0.22	0.12	0.19	0.23	0.30	0.42	0.51
Pulp-Paper and Metal Industry	5,097.4	0.02	0.04	0.06	0.09	0.04	0.09	0.13	0.17	0.01	-0.01	0.03	0.02	0.09	0.08	0.05	0.04	0.12	0.10	0.26	0.26
Fuel and Chemical Industry	3,734.6	-0.26	-0.50	-0.80	-1.10	-0.53	-1.00	-1.60	-2.20	-0.38	-0.41	-0.61	-0.64	-1.29	-1.40	-0.90	-0.93	-1.61	-1.64	-3.49	-3.60
Electricity-Gas-Water	921.9	-0.02	-0.04	-0.07	-0.09	-0.04	-0.09	-0.13	-0.19	-0.26	-0.26	-0.28	-0.28	-0.58	-0.68	-0.30	-0.30	-0.37	-0.37	-0.77	-0.86
Construction	5,587.4	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.90	1.20	0.90	1.20	1.79	2.09	0.90	1.20	0.90	1.20	1.79	2.09
Restaurant	2,487.4	0.00	-0.01	-0.02	-0.01	-0.01	-0.02	-0.04	-0.02	-0.40	-0.39	-0.40	-0.40	-0.74	-0.81	-0.41	-0.40	-0.42	-0.42	-0.76	-0.83
Ground Transportation	1,089.4	-0.01	-0.03	-0.01	-0.10	-0.02	-0.05	-0.03	-0.20	-0.57	-0.84	-0.59	-0.86	-1.14	-1.41	-0.59	-0.87	-0.64	-0.91	-1.34	-1.61
Financial Services	1,866.8	0.01	0.01	0.02	0.02	0.01	0.02	0.03	0.04	-0.13	-0.13	-0.13	-0.13	-0.26	-0.26	-0.12	-0.12	-0.11	-0.11	-0.22	-0.22
Government and Private Services	3,400.3	0.03	0.07	0.10	0.14	0.07	0.14	0.21	0.28	0.55	0.83	0.58	0.86	1.27	1.35	0.62	0.89	0.72	1.00	1.55	1.63

Source: CGE Simulation Results.

Appendix 2. Simulated Price Changes (%) under Various Simulation of Fuel Subsidy Systems and Reallocation Policies

Commodity	SIM1	SIM2	SIM3	SIM4	SIM1a	SIM2a	SIM3a	SIM4a	SIM5	SIM6	SIM7	SIM8	SIM9	SIM10	SIM5a	SIM6a	SIM7a	SIM8a	SIM9a	SIM10a
Food Croops	0.16	0.12	0.30	0.60	0.32	0.24	0.60	1.20	-0.18	-0.46	-0.46	-0.74	-0.72	-1.07	-0.26	-0.53	-0.34	-0.62	-0.12	-0.47
Soybeans	0.04	0.10	0.20	0.50	0.09	0.20	0.40	1.00	0.03	-0.06	-0.06	-0.22	-0.15	-0.03	-0.08	-0.23	0.04	-0.12	0.65	0.47
Other Croops	0.08	0.16	0.35	0.55	0.17	0.32	0.69	1.10	-0.08	-0.34	-0.34	-0.49	-0.33	-0.75	-0.34	-0.49	-0.18	-0.33	0.21	-0.20
Livestock	0.05	0.10	0.20	0.40	0.10	0.20	0.40	0.80	-0.24	-0.52	-0.52	-0.79	-0.74	-1.26	-0.52	-0.79	-0.42	-0.69	-0.34	-0.86
Forestry	0.15	0.20	0.30	0.60	0.30	0.40	0.60	1.20	0.66	0.70	0.70	0.84	1.59	1.69	0.80	0.93	0.90	1.04	2.19	2.29
Fishery	0.13	0.25	0.48	0.70	0.25	0.50	0.95	1.40	-0.51	-0.99	-0.99	-1.57	-1.76	-2.44	-0.99	-1.57	-0.74	-1.32	-1.06	-1.74
Oil and Metal Mining	-0.20	-0.50	-0.70	-0.90	-0.40	-1.00	-1.40	-1.80	-0.71	-0.72	-0.72	-0.91	-1.53	-1.58	-0.62	-0.81	-1.22	-1.41	-2.43	-2.48
Other Mining and Quarrying	-0.30	-0.60	-1.00	-1.10	-0.60	-1.20	-2.00	-2.20	0.34	0.71	0.71	1.19	1.69	2.12	0.71	1.19	0.11	0.59	0.59	1.02
Rice	0.12	0.13	0.35	0.59	0.24	0.27	0.71	1.18	-0.29	-0.66	-0.66	-1.26	-1.25	-1.69	-0.56	-1.16	-0.53	-1.13	-0.67	-1.10
Food and Beverage Industry	0.04	0.00	0.10	0.40	0.07	0.00	0.20	0.80	-0.16	-0.32	-0.32	-0.57	-0.31	-0.58	-0.25	-0.49	-0.32	-0.57	0.09	-0.18
Textile-clothes-leather Industry	0.03	0.10	0.20	0.30	0.07	0.20	0.40	0.60	-0.12	-0.15	-0.15	-0.36	-0.37	-0.51	-0.19	-0.40	-0.05	-0.26	-0.07	-0.21
Wood Processing Industry	0.00	-0.10	-0.01	0.00	0.00	-0.21	-0.02	0.00	0.16	0.41	0.41	0.47	0.87	1.00	0.52	0.58	0.31	0.37	0.87	1.00
Pulp-Paper and Metal Industry	0.04	0.00	0.10	0.30	0.08	0.00	0.20	0.60	0.10	0.11	0.11	0.11	0.41	0.39	0.19	0.19	0.11	0.11	0.71	0.69
Fuel and Chemical Industry	1.40	2.70	4.20	5.80	2.80	5.40	8.40	11.60	2.63	2.51	2.51	2.49	5.44	5.31	2.61	2.59	5.21	5.19	11.24	11.11
Electricity-Gas-Water	0.16	0.10	0.30	0.60	0.33	0.20	0.60	1.20	-0.56	-0.62	-0.62	-0.81	-0.89	-1.11	-0.40	-0.58	-0.52	-0.71	-0.29	-0.51
Construction	0.09	0.10	0.25	0.54	0.19	0.20	0.49	1.08	1.24	1.76	1.76	2.36	4.01	4.67	1.85	2.45	1.86	2.46	4.55	5.21
Trade	-1.90	-1.00	-4.90	-10.40	-3.80	-2.00	-9.80	-20.80	-2.35	-2.20	-2.20	-3.36	-13.75	7.99	-5.00	-6.16	-3.20	-4.36	-24.15	-2.41
Restaurant	0.03	-0.04	0.05	0.18	0.07	-0.08	0.09	0.36	-0.81	-1.02	-1.02	-1.20	-1.78	-2.02	-0.91	-1.09	-1.06	-1.24	-1.60	-1.84
Hotel	0.05	0.01	0.10	0.30	0.11	0.01	0.20	0.60	-0.44	-0.53	-0.53	-0.59	-0.75	-0.76	-0.43	-0.49	-0.52	-0.58	-0.45	-0.46
Ground Transportation	0.19	0.40	0.64	0.93	0.39	0.80	1.28	1.86	0.44	0.50	0.50	0.59	0.92	1.08	0.48	0.58	0.90	0.99	1.85	2.01
Air-Water Transp. And Telecommunication	0.06	0.02	0.14	0.30	0.12	0.04	0.28	0.60	-0.57	-0.64	-0.64	-0.72	-1.09	-1.17	-0.53	-0.62	-0.62	-0.70	-0.79	-0.87
Warehousing	-0.04	-0.18	-0.11	-0.11	-0.07	-0.36	-0.22	-0.21	-0.11	-0.09	-0.09	0.03	0.23	0.18	0.02	0.13	-0.27	-0.15	0.12	0.08
Financial Services	0.04	0.00	0.11	0.18	0.08	0.00	0.22	0.35	-1.01	-1.23	-1.23	-1.40	-2.30	-2.54	-1.14	-1.31	-1.23	-1.40	-2.12	-2.37
Real Estate	0.04	-0.01	0.06	0.26	0.09	-0.03	0.12	0.52	-0.42	-0.55	-0.55	-0.73	-0.96	-1.08	-0.44	-0.63	-0.56	-0.75	-0.70	-0.82
Government and Private Services	0.03	-0.04	0.04	0.17	0.07	-0.09	0.08	0.35	2.16	3.09	3.09	4.22	6.84	7.91	3.20	4.33	3.05	4.18	7.01	8.08
Individual Services	0.04	-0.01	0.04	0.22	0.09	-0.01	0.08	0.44	-0.33	-0.46	-0.46	-0.43	-0.57	-0.58	-0.36	-0.34	-0.46	-0.44	-0.34	-0.36

Source: CGE Simulation Result.

Appendix 3. Simulated Factor Income Changes (%) under Various Simulation of Fuel Subsidy Systems and Reallocation Policies

Factor Production	SIM1	SIM2	SIM3	SIM4	SIM1a	SIM2a	SIM3a	SIM4a	SIM5	SIM6	SIM7	SIM8	SIM9	SIM10	SIM5a	SIM6a	SIM7a	SIM8a	SIM9a	SIM10a
Rural Agricultural Labor	0.07	0.04	0.18	0.38	0.14	0.09	0.36	0.76	-0.64	-0.98	-0.67	-1.01	-0.93	-1.42	-0.57	-0.91	-0.63	-0.97	-0.55	-1.04
Urban Agricultural Labor	0.09	0.09	0.25	0.47	0.19	0.17	0.50	0.93	-0.70	-1.08	-0.71	-1.08	-1.02	-1.55	-0.61	-0.98	-0.62	-1.00	-0.56	-1.08
Rural Production-Operator-Unskilled Labor	-0.73	-1.58	-2.29	-2.97	-1.45	-3.15	-4.58	-5.94	0.26	0.59	-0.60	-0.26	-0.92	-0.68	-0.47	-0.14	-2.17	-1.84	-3.89	-3.65
Urban Production-Operator-Unskilled Labor	-0.67	-1.46	-2.11	-2.73	-1.34	-2.92	-4.22	-5.46	0.14	0.42	-0.65	-0.37	-1.04	-0.85	-0.53	-0.24	-2.11	-1.83	-3.77	-3.58
Rural sales and administration (semi-skilled) labor	-0.27	-0.67	-0.93	-1.15	-0.55	-1.34	-1.85	-2.31	0.11	0.53	-0.29	0.13	-0.23	0.07	-0.16	0.25	-0.96	-0.54	-1.39	-1.08
Urban sales and administration (semi-skilled) labor	-0.32	-0.75	-1.05	-1.32	-0.63	-1.51	-2.10	-2.64	0.28	0.70	-0.16	0.26	0.01	0.33	-0.04	0.39	-0.92	-0.49	-1.31	-0.99
Rural skilled labor	-0.07	-0.26	-0.29	-0.28	-0.14	-0.51	-0.57	-0.55	4.97	6.61	4.79	6.42	10.34	11.97	4.90	6.54	4.53	6.17	10.06	11.69
Urban skilled labor	-0.19	-0.49	-0.64	-0.76	-0.37	-0.98	-1.29	-1.52	4.18	5.62	3.88	5.32	8.40	9.81	4.00	5.44	3.39	4.83	7.64	9.05
Non Labor Factor	-0.88	-1.86	-2.68	-3.45	-1.76	-3.73	-5.37	-6.90	-1.17	-1.20	-2.15	-2.19	-3.98	-4.10	-2.05	-2.08	-4.01	-4.05	-7.43	-7.55

Source: CGE Simulation Results.

Appendix 4. Simulated Selected Poverty Line (%) under Various Simulation of Fuel Subsidy Systems and Reallocation Policies

Province	Initial Poverty Line 2005		SIM1		SIM2		SIM3		SIM4		SIM6		SIM8		SIM10	
	Urban	Rural	Urban	Rural	Urban	Rural	Urban	Rural	Urban	Rural	Urban	Rural	Urban	Rural	Urban	Rural
Nanggroe Aceh D.	195,882	166,608	196,117	166,794	196,171	166,825	196,527	167,114	197,095	168,576	194,978	166,455	195,032	165,987	195,063	165,635
North Sumatera	175,152	117,578	175,362	117,709	175,410	117,731	175,728	117,935	176,237	118,967	174,343	117,470	174,392	117,140	174,420	116,891
West Sumatera	175,730	125,602	175,940	125,742	175,989	125,766	176,308	125,984	176,819	127,086	174,919	125,487	174,967	125,134	174,996	124,868
Riau	196,892	151,718	197,128	151,887	197,182	151,916	197,540	152,179	198,112	153,510	195,983	151,579	196,038	151,153	196,069	150,832
Jambi	187,608	122,185	187,833	122,321	187,885	122,344	188,225	122,556	188,770	123,628	186,742	122,073	186,794	121,730	186,824	121,471
South Sumatera	172,684	120,331	172,891	120,465	172,939	120,488	173,252	120,697	173,754	121,752	171,887	120,221	171,935	119,883	171,962	119,628
Bengkulu	172,659	110,275	172,866	110,398	172,914	110,419	173,227	110,610	173,729	111,578	171,862	110,174	171,910	109,864	171,937	109,631
Lampung	164,909	113,728	165,106	113,855	165,152	113,876	165,452	114,074	165,931	115,071	164,148	113,624	164,193	113,304	164,220	113,064
Bangka Belitung	197,082	178,701	197,318	178,900	197,373	178,934	197,731	179,244	198,303	180,812	196,172	178,537	196,227	178,035	196,258	177,657
Riau Island	231,346	156,453	231,623	156,627	231,687	156,657	232,107	156,929	232,779	158,301	230,278	156,309	230,342	155,870	230,379	155,539
DKI Jakarta	237,735	-	238,020	-	238,085	-	238,517	-	239,208	-	236,638	-	236,703	-	236,741	-
West Java	151,235	113,964	151,416	114,091	151,458	114,112	151,733	114,310	152,172	115,310	150,537	113,859	150,579	113,539	150,603	113,298
Central Java	143,776	120,115	143,948	120,249	143,988	120,271	144,249	120,480	144,667	121,534	143,112	120,005	143,152	119,667	143,175	119,413
DI Yogyakarta	160,690	130,807	160,882	130,953	160,927	130,977	161,219	131,205	161,685	132,352	159,948	130,687	159,993	130,320	160,018	130,043
East Java	146,743	115,272	146,919	115,400	146,959	115,422	147,226	115,622	147,652	116,634	146,066	115,166	146,106	114,842	146,130	114,599
Banten	183,927	108,855	184,147	108,976	184,198	108,997	184,532	109,186	185,066	110,141	183,078	108,755	183,129	108,449	183,158	108,219
Bali	166,962	136,897	167,162	137,049	167,208	137,075	167,511	137,313	167,996	138,514	166,191	136,771	166,238	136,387	166,264	136,097
West Nusa Tenggara	134,488	109,403	134,649	109,525	134,686	109,545	134,931	109,736	135,321	110,695	133,867	109,303	133,904	108,995	133,926	108,764
East Nusa Tenggara	141,168	89,764	141,337	89,864	141,376	89,881	141,633	90,037	142,042	90,824	140,516	89,682	140,555	89,430	140,578	89,240
West Kalimantan	164,397	109,777	164,594	109,899	164,639	109,920	164,938	110,111	165,415	111,074	163,638	109,676	163,684	109,368	163,710	109,136
Central Kalimantan	161,231	125,980	161,424	126,120	161,469	126,144	161,762	126,363	162,230	127,468	160,487	125,864	160,531	125,511	160,557	125,244
South Kalimantan	163,565	107,455	163,761	107,575	163,806	107,595	164,103	107,782	164,578	108,724	162,810	107,356	162,855	107,055	162,881	106,827
East Kalimantan	213,378	161,910	213,634	162,090	213,693	162,121	214,080	162,402	214,700	163,822	212,393	161,761	212,452	161,307	212,486	160,964
North Sulawesi	150,421	118,675	150,601	118,807	150,643	118,830	150,916	119,036	151,353	120,077	149,727	118,566	149,768	118,233	149,792	117,982
Central Sulawesi	173,991	121,193	174,199	121,328	174,248	121,351	174,564	121,561	175,069	122,624	173,188	121,082	173,236	120,741	173,264	120,485
South Sulawesi	138,576	97,027	138,742	97,135	138,780	97,153	139,032	97,322	139,434	98,173	137,936	96,938	137,975	96,665	137,997	96,460
South East Sulawesi	122,067	107,902	122,213	108,022	122,247	108,043	122,469	108,230	122,823	109,176	121,504	107,803	121,537	107,500	121,557	107,272
Gorontalo	135,837	115,018	136,000	115,146	136,037	115,168	136,284	115,368	136,678	116,377	135,210	114,912	135,248	114,589	135,269	114,346
West Sulawesi	189,173	150,271	189,400	150,438	189,452	150,467	189,795	150,728	190,345	152,046	188,300	150,133	188,352	149,711	188,382	149,393
Maluku	174,425	122,936	174,634	123,073	174,682	123,096	174,999	123,310	175,506	124,388	173,620	122,823	173,668	122,478	173,696	122,218
Papua	193,307	145,610	193,538	145,772	193,592	145,800	193,943	146,053	194,504	147,330	192,415	145,476	192,468	145,067	192,499	144,760
National	**165,565**	**117,365**	**165,763**	**117,496**	**165,809**	**117,518**	**166,110**	**117,722**	**166,591**	**118,751**	**164,801**	**117,257**	**164,847**	**116,928**	**164,873**	**116,680**

Source: Author's calculations based on CGE results.